

# 3D Display System



## Background

There are more and more areas that need 3D stereoscopic display, such as the virtual 3D display of precious artifacts in museum, 3D TV and so on, but the existing products are expensive and the display cannot be controlled by the user.



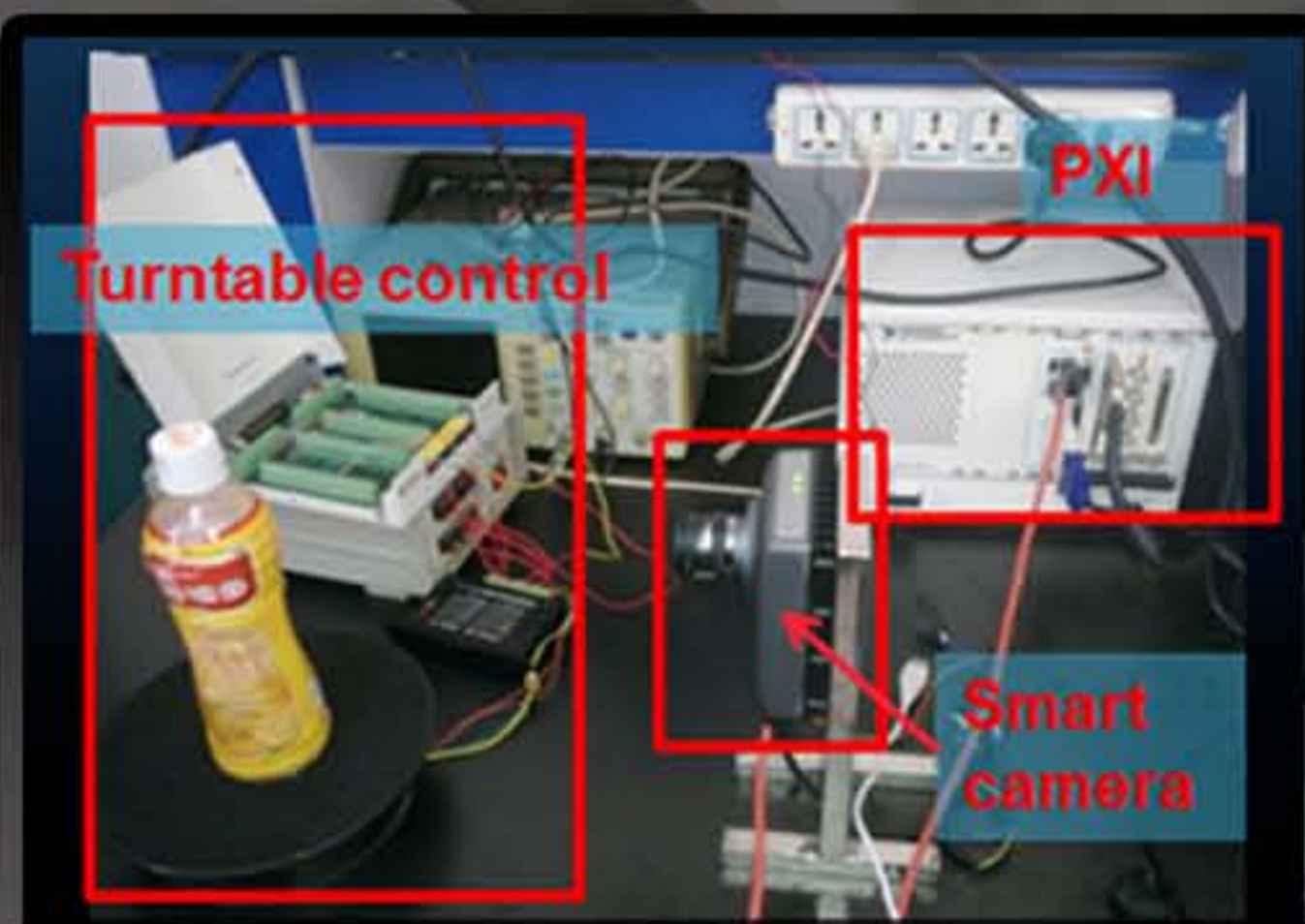
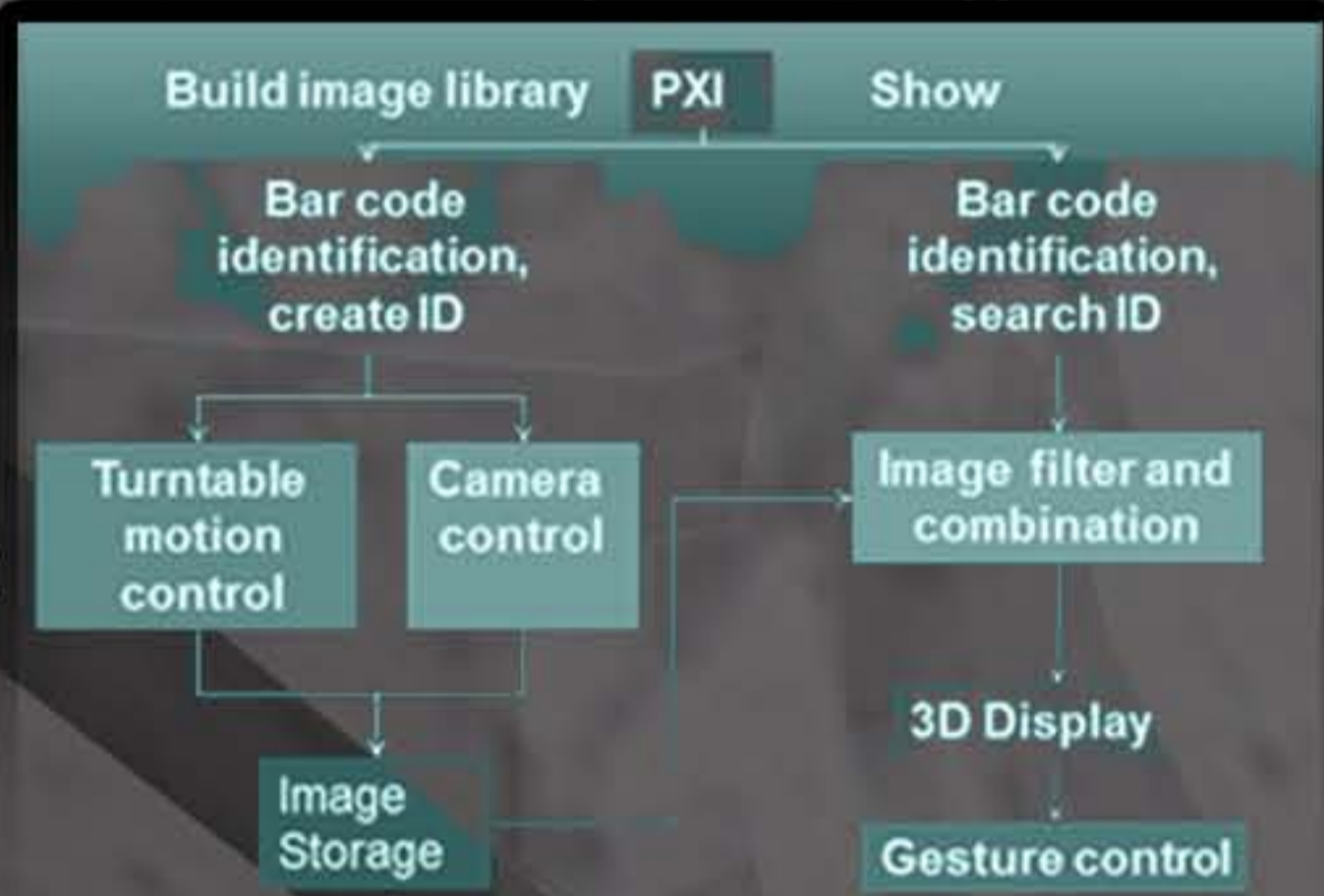
## Project Objective

3D DISPLAY SYSTEM is to develop a low-cost, 360-degree view 3D display system, with objects acquisition and display functions, and can be man-machine interaction.

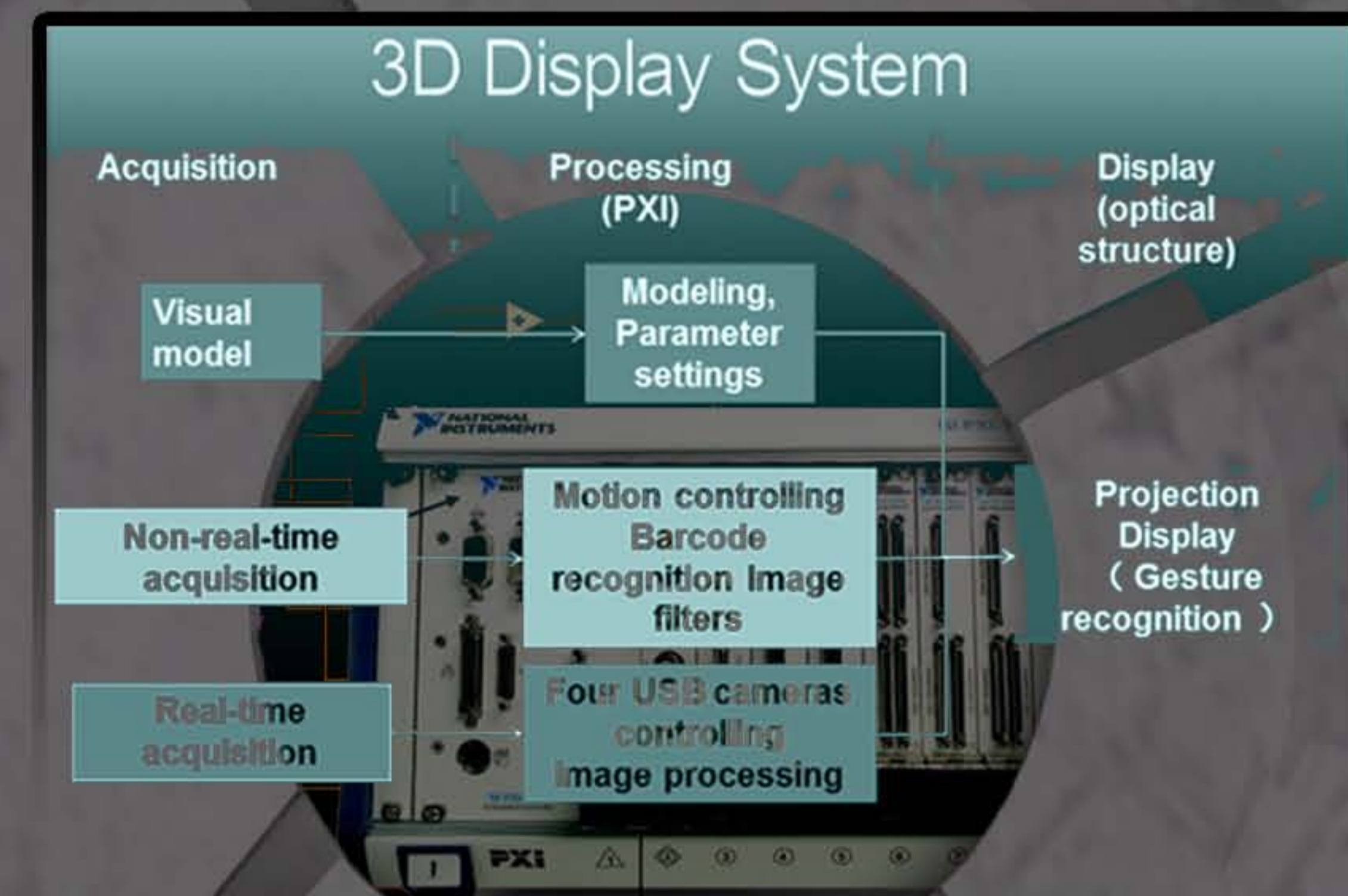


## Non-Real Time Acquisition

PXI 7340 is to control stepper motor to turning the object for image acquiring; NI smart camera(1764) is used to acquire images as the raw materials: acquiring is synchronized with the motion control, which guarantee raw data can be transferred to 3D images without distortion;



## Solution



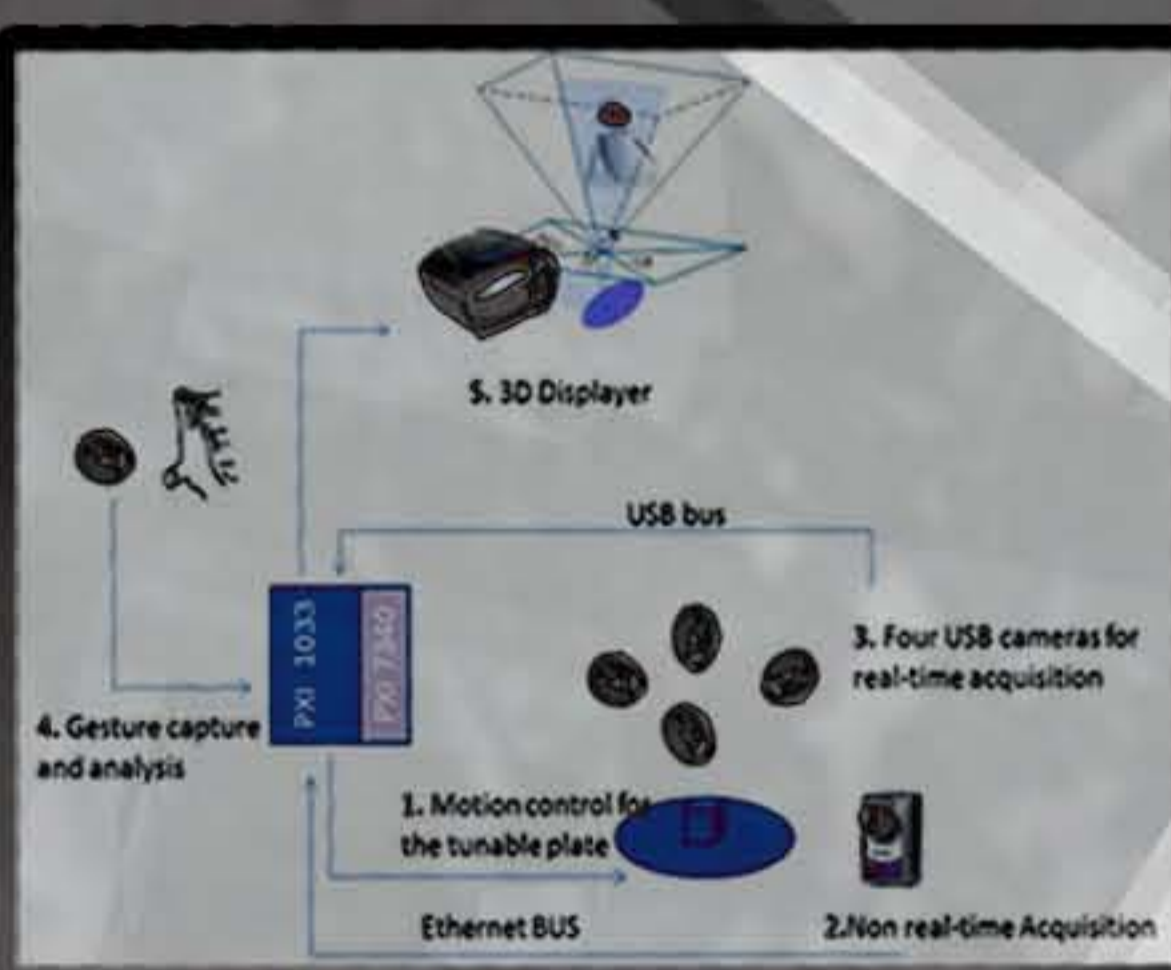
## 3D Display

Modeling or read standard 3D model



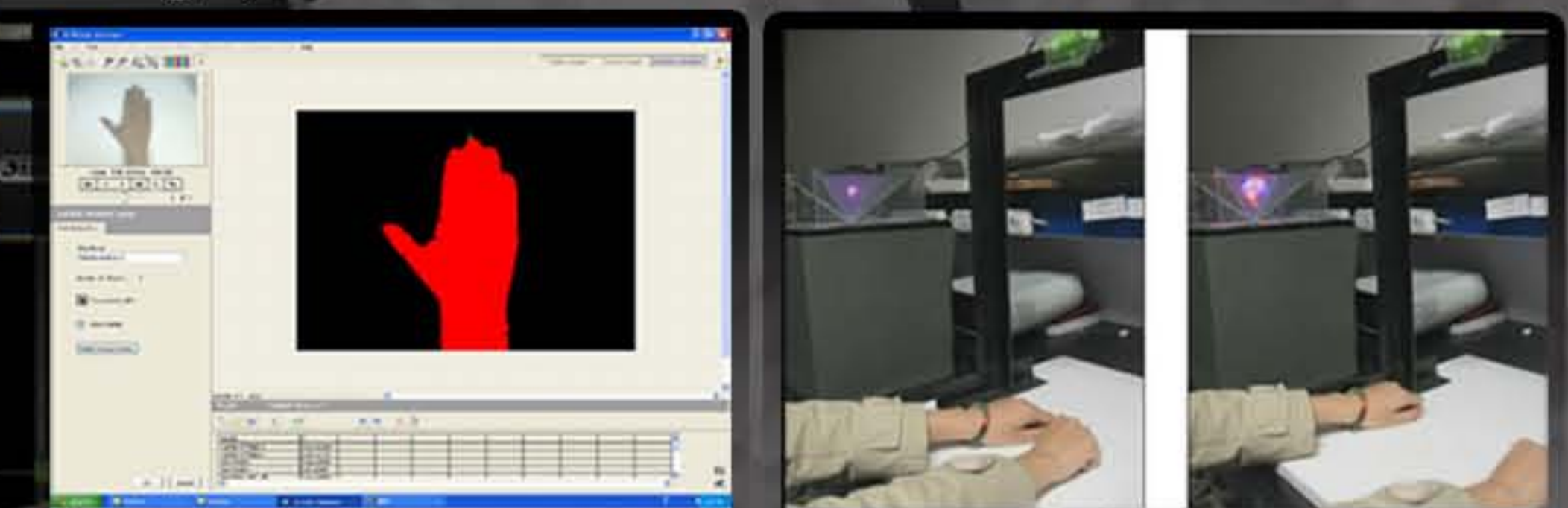
## Operation Process

1. Acquire raw image to build 3D image library (using 4 USB cameras or smart camera to get all dimensional information for object);
2. Using VDM to process the image and build 3D image library of the object;
3. Project the image on 3D displayer;
4. Using USB camera for gesture capture and recognition (the algorithm is developed in Vision assistant), to turn, zoom in/out the image.



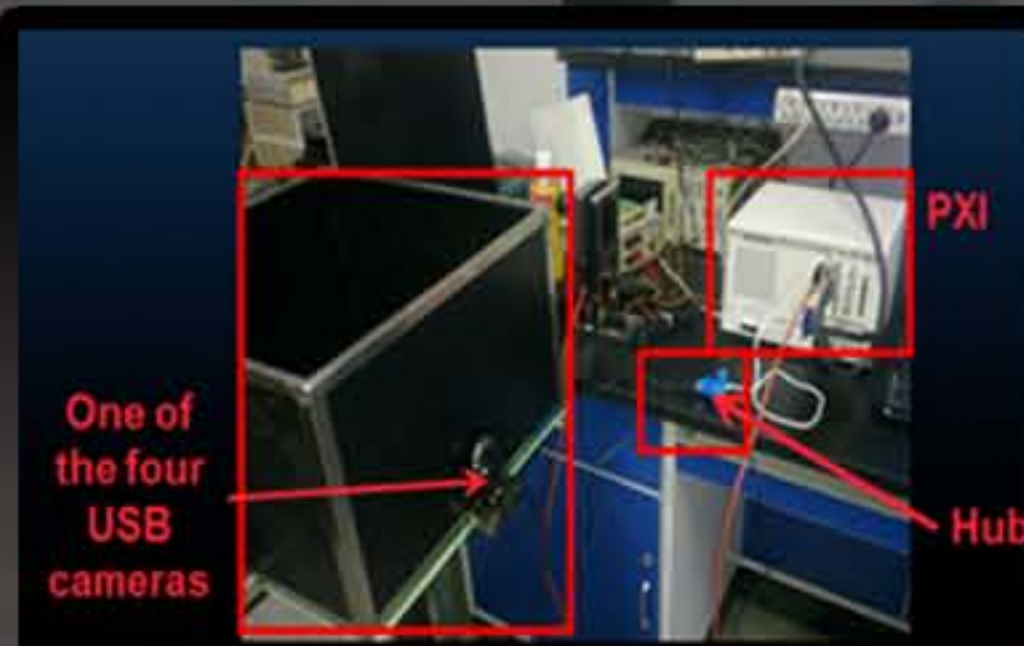
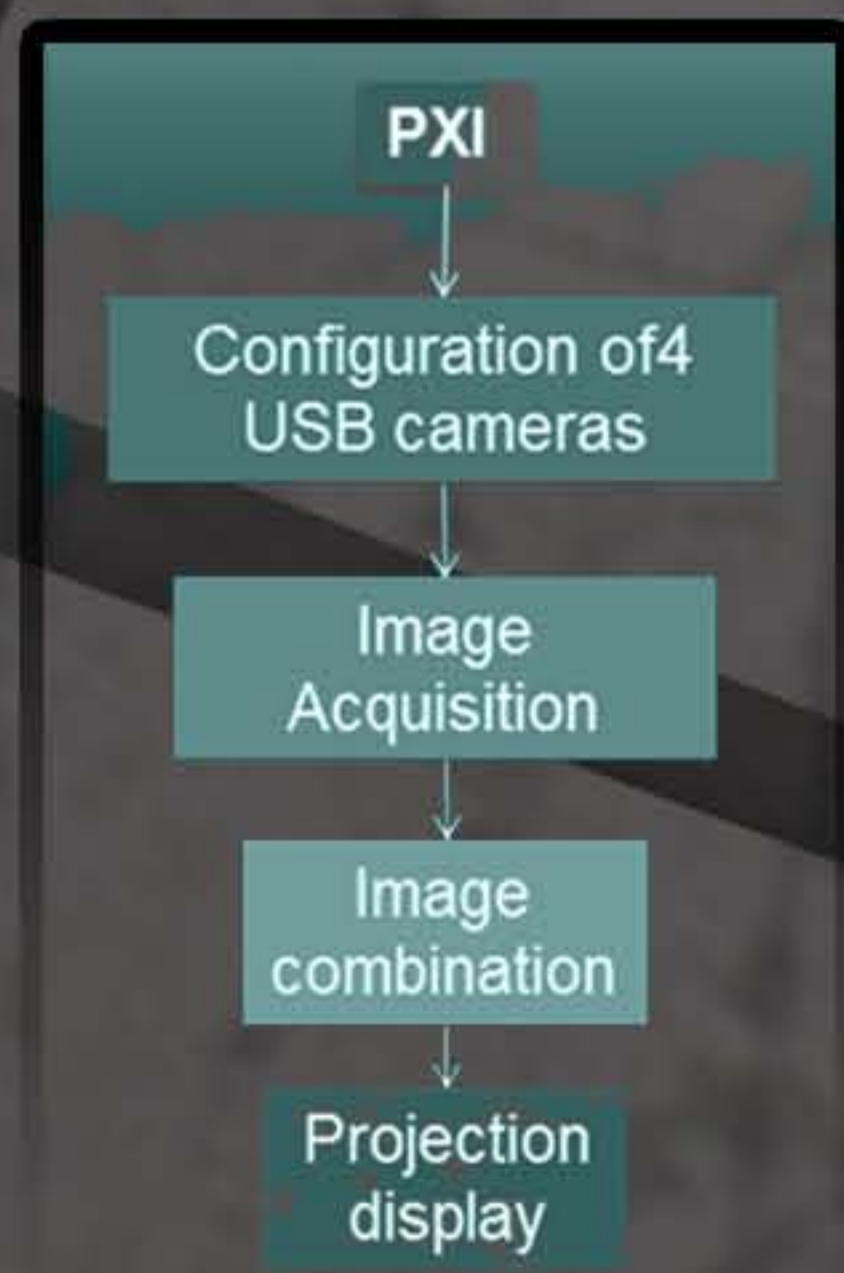
## Interaction

We capture the image sequences of hand and judge its movement, Vision Assistants helps to develop an algorithm to capture and recognition the gesture to control the 3D image, such as rotate, zoom in and out



## Real Time Acquisition

Using the Vision Acquisition driver, 4 third party USB cameras are used for real-time image acquisition in LabVIEW and separate images are filtered and processed, then integrated all by the VDM' functions for 3D displaying.



## Project Management

Project Expenses: \$300; Man-Hour Cost: \$40  
 Donated Hardware: Smart camera; PXIe-1084; PXI-7340; PXI-4130



Gao Yongfeng,  
Zhang Qian,  
Xu Mohan,  
Yang Hao,  
Gao Yuan